REMARKS

Claims 1 to 15 are all the claims pending in the application, prior to the present Amendment.

Applicant has added new claim 16. Support for claim 16 can be found at page 26, lines 7 to 15 of the specification.

Claims 1-5, 7-9, 11-13 and 15 have been rejected under 35 U.S.C. § 102(b) as anticipated by JP A-5 339490.

Applicant submits that JP '490 does not disclose or render obvious the presently claimed invention and, accordingly, requests withdrawal of this rejection.

The present invention is directed to a curable composition comprising a reactive silicon group-containing polyoxyalkylene polymer, a filler (C) and a curing catalyst (D). The curable composition comprises 0 to 10 parts by weight of a plasticizer in relation to 100 parts by weight of the reactive silicon group-containing polyoxyalkylene polymer. The reactive silicon group-containing polyoxyalkylene polymer is obtained by reacting a polyoxyalkylene polymer (A) having a molecular weight distribution of 1.6 or less, a number average molecular weight of 15,000 to 50,000, and 0.8 or more reactive groups, on average, per molecule thereof with an organic compound (B) having in the molecule thereof a reactive silicon group and a functional group capable of reacting with the reactive groups of the polymer (A) in a proportion of 0.8 to 1.5 molecules of the organic compound (B), on average, per molecule of the component (A).

Thus, applicants have amended claim 1 to state that a plasticizer is present in an amount of 0 to 10 parts by weight or less in relation to 100 parts by weight of the reactive silicon group-

containing polyoxyalkylene polymer. Support for this amendment can be found at page 26, line 16 to page 27, line 4 in the specification and claim 3. Applicant has canceled claim 3.

As described in the background art section of the specification, when a curable composition containing a reactive silicon group-containing polyoxyalkylene polymer is used as a sealant, it has a problem of staining caused by plasticizers. If no plasticizers are used in the composition, however, the quality of the curable composition is degraded. Namely, the curable composition exhibits a high viscosity and the cured product has a high modulus and a low elongation. Further, the curable composition may have a problem of staining caused by a polyoxyalkylene polymer having no reactive silicon group.

The present invention not only has solved the staining problem, but also has achieved a satisfactory workability of the curing composition and favorable mechanical properties of the cured product by using no plasticizers or an incredibly small amount of plasticizers. It should be noted that such workability and mechanical properties could not be achieved conventionally without using plasticizers.

According to the present invention, the satisfactory workability and favorable mechanical properties can be achieved by the curable composition containing no plasticizer or containing at most 10 parts by weight of a plasticizer in relation to 100 parts by weight of the reactive silicon group-containing polyoxyalkylene polymer. Further, no staining problem arises.

The effect of the present invention can be attained by adjusting the molecular weight distribution, the number average molecular weight and the silylation of the polyoxyalkylene polymer, and also the content of the plasticizer.

Specifically, one molecule of the reactive silicon group-containing polyoxyalkylene polymer of the present invention has 0.8 to 1.5 reactive silyl groups on average.

A comparison between the working Examples and Comparative Examples of the present application clearly shows the effect of the silylation rate of this range.

In Comparative Example 3, where no plasticizer is used, the average number of the reactive silicone group in one polymer molecule is 1.6. Since the average number exceeded 1.5, the cured product has a high modulus (M100) and a low elongation, as can be seen in Table 1 of the present application.

In Comparative Example 1, where the average number of the reactive silicone group is 1.96, plasticizer is used. As can be seen in Table 1, the modulus is lowered and the elongation is increased compared to Comparative Example 3 due to plasticizer, but the properties are still unfavorable since the average number is over 1.5.

What is more, the plasticizer in Comparative Example 1 generates staining (bleeding to natural marble and dust adhesion on painted surface) as can be seen in Table 1.

In Comparative Example 2, where the average number of the reactive silicone group is 0.74, staining is observed since the proportion of the polyoxyalkylene polymers having no reactive silicon groups is large.

On the other hand, the invention Examples of the present application show remarkable improvements.

In Example 1, the average number of the reactive silicone group is 1.2, and no plasticizer is used. As can be seen in Table 1, the cured product has favorable modulus and elongation. In

addition, there is no staining problem. Controlling the average number of the reactive silicone group within a specific range enables the achieving of the effect of the present invention without using plasticizers.

In Example 2, where a plasticizer is used in an amount within the claimed range, the cured product has favorable modulus and elongation, despite the small amount of the plasticizer. Further, there is no staining problem even though a plasticizer is used.

Turning now to JP '490 to Higuchi et al, it is directed to a curable composition that comprises a reactive silyl group-containing polyoxyalkylene polymer and a polyether monool as a plasticizer.

First, the curable composition of JP '490 to Higuchi et al comprises a plasticizer in a large amount, which is different from the curable composition of the present invention which comprises no plasticizer or at most 10 parts by weight of a plasticizer in relation to 100 parts by weight of the reactive silicon group-containing polyoxyalkylene polymer.

Concerning the silylation of the polymer, JP '490 to Higuchi et al teaches in paragraph [0024] that a silylation rate is 50% or more, more preferably 70% or more. In the Examples of JP '490 to Higuchi et al, both ends of polyoxyalkylene polymer A are silylated. Thus, the entire polymer in JP '490 is fully silylated, and the number of reactive silyl groups becomes about 2. Therefore, JP '490 to Higuchi et al substantially teaches a high silylation rate.

Concerning the plasticizer, as can be seen in Table 1 at paragraph [0043] of JP '490 to Higuchi et al, 50 parts of the plasticizer is blended with 100 parts of polyoxyalkylene polymer A in the Examples of JP '490 to Higuchi et al. Therefore, JP '490 to Higuchi et al substantially

teaches using a large amount of plasticizer, and does not teach or suggest a composition which contains no plasticizer or at most 10 parts by weight of a plasticizer in relation to 100 parts by weight of a reactive silicon group-containing polyoxyalkylene polymer.

The above teachings of JP '490 to Highuchi et al mean that a high silylation rate of the polyoxyalkylene polymer requires use of plasticizers in order not to degrade mechanical properties of the cured product. Thus, the Examples of JP '490 to Higuchi et al correspond to Comparative Example 1 of the present application.

JP '490 to Higuchi et al does not teach reducing the amount of plasticizers, although JP '490 to Higuchi at al teaches that the use of conventional plasticizers causes problems. See paragraphs [0002] to [0005]. Further, JP '490 to Higuchi et al teaches neither the problems which arise when the amount of plasticizers is reduced, nor the solution. Therefore, there is no motivation to reduce the amount of plasticizers, and it is impossible to envisage the solution to the problems which arise when the amount of plasticizers is reduced.

As discussed above, the composition of JP '490 to Higuchi et al has a polyoxyalkylene polymer with a high silylation rate and a large amount of plasticizer, and is completely different from the curable composition of the present invention. JP '490 to Higuchi et al teaches away from the present invention where the curable composition comprises no plasticizer or at most 10 parts by weight of a plasticizer in relation to 100 parts by weight of the reactive silicon group-containing polyoxyalkylene polymer.

Further, it is not predictable from JP '490 to Higuchi at al that the amount of plasticizer can be reduced by adjusting the silylation rate within a specific range. Accordingly, the present invention is neither anticipated by nor rendered obvious by JP '490 to Higuchi et al.

Still further, JP '490 to Higuchi et al uses polyether monool as a plasticizer in order to solve problems generated by conventional plasticizers such as dioctyl phthalate (DOP) or polyether compounds. See paragraphs [0003] and [0004]. According to the embodiment of the present invention set forth in claim 16, the plasticizers are those which cause problems according to JP '490 to Higuchi et al. The present invention as set forth in claim 16 is not anticipated or suggested by JP '490 to Higuchi et al since JP '490 to Higuchi et al does not teach the combination of the conventional plasticizers in a low amount and a polyoxyalkylene polymer.

In view of the above, applicant submits that JP '490 to Higuchi et al does not disclose or suggest the subject matter of claim 1 and, accordingly, requests withdrawal of this rejection.

Claims 1-5, 7-9, 11-13 and 15 have been rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over U.S. Patent Application Publication No. 2004/0188016 to Mahdi et al.

Applicant submits that Mahdi et al do not disclose or render obvious the subject matter of the present claims and, accordingly, request withdrawal of this rejection.

Concerning Example 8 of Mahdi et al, upon which the Examiner relies, the Examiner agrees to the fact that polypropylene glycol diol has a molecular weight of 12,200. Since one molecule of the polypropylene glycol diol has two hydroxyl groups, the molecular weight of the

polypropylene glycol diol which has a hydroxyl equivalent weight of 6,100 is twice the hydroxyl equivalent weight, namely, 12,200.

This weight does not satisfy the requirement in claim 1 of a molecular weight of at least 15,000.

With respect to the 0.8 to 1.5 ratio set forth in the present claims, the Examiner indicates that he is not in agreement with applicant's interpretation of Example 8.

In response, applicant points out that the 2366.2 g of polypropylene glycol diol employed in Example 8 of Mahdi et al equals 0.194 mol (2366.2 g/12,200) of polypropylene glycol diol. Here, equivalence of hydroxyl group is twice the number of moles of the diol since the diol has two hydroxyl groups per molecule. Accordingly, 0.194 mol of diol, namely, 0.388 equivalent of hydroxyl group, reacts with 83.8 g (0.409 mol) of isocyanatopropyl trimethoxysilane in Example 8. This means that 2.1 molecules of isocyanatopropyl trimethoxysilane react with one molecule of polypropylene glycol diol (0.409/0.194). This ratio clearly does not fall within the range of 0.8 to 1.5 molecules of (B) per molecule of (A) recited in claim 1. Further, this means that an excessive amount of isocyanatopropyl trimethoxysilane is provided in Mahdi et al with respect to the total amount of the hydroxyl groups of the polypropylene glycol diol.

Concerning the silylation of diol, Mahdi et al teach in paragraph [0037] that where a high molecular weight polyol is used, it is preferred that a sufficient amount of isocyanato silane be used to react with all of the hydroxyl functionality of the polyol. See page 4, right column, lines 10 to 14. The ratio of hydroxyl moieties to isocyanate moieties of the isocyanato silane is preferably from about 0.75:1.0 to 0.95:1.0. See the last three lines in [0037].

The procedures in Example 8 of Mahdi et al are in accordance with the above teaching of Mahdi et al. Within the range of the above ratio, an excessive amount of isocyanato silane is provided with respect to the total amount of hydroxyl group, so that all of the hydroxyl groups of the polyol react with isocyanato silane. That is different from the present invention where the reactive groups are partially silylated.

Thus, it is clear that Mahdi et al do not satisfy the 0.8 to 1.5 ratio set forth in claim 1.

In view of the above, applicant submits that Mahdi et al do not disclose or suggest the subject matter of claim 1 and, accordingly, requests withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,

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